

Exhibit D

Cultural Resources

Appendix H

Exhibit D Cultural Resources Table of Contents

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CULTURAL RESOURCES

General

The purpose of this cultural resource assessment is to determine the most likely type of cultural resource present in the study area and to estimate its distribution. Shipwrecks are the most probable cultural resources expected to exist in the study area. The potential resource base includes a wide variety of sail as well as mechanically powered vessels. Vessels may include those engaged in early exploration of the coast and the fur trade (1790's - 1850); those limited to the coastal trade supplying pioneer settlements (1820's - early 1900's); and vessels engaged in the parallel development of the international trade. (Lockley, 1900; Meinig, 1968).

Shipwrecks are often considered the most difficult cultural resource to identify and address for the following reasons: (1) documentary evidence indicates that numerous vessels that wrecked over time; (2) given the size of these cultural resources and the project's depositional environment, preservation of some shipwrecks is likely in portions of the study area; and, (3) although the records of shipwreck sites are sufficiently accurate however, records or other documentation regarding salvage and removal of such shipwrecked vessels either is non-existent in the popularized notarization of the disaster or has been lost to the official record.

Prehistoric cultural resources are unlikely to be found in the project area. The assumption that Native Americans could have been present in the project area is based on the fact that 5,000 years ago sea levels were considerably lower than present levels. However, any prehistoric sites present on former shorelines are now inundated by present ocean levels and buried under substantial amounts of sand deposited during recent geological times (Aikens, 1984 and Fladmark, 1975). In addition, the current landscape has been altered by construction of the jetties. For example, the 1880's Clatsop Spit Beach's general limits have extended seaward because of the accretion pattern caused by construction of the South Jetty. Since the 1880's deposits have further buried pre-jetty beach and tidal areas, although pockets of erosion exist (CREDDP, 1983).

Shipwreck Maps

Three shipwreck maps were consulted: Mouth of The Columbia River Entrance, Record of Marine Disasters (USACE, 1936); The Columbia River Entrance: The Wrecks and Marine History of Its Development (McBean, 1936); and, The Pacific Graveyard, Shipwreck Chart (Gribbs, 1964). With few exceptions the mapped locations of shipwrecks on different charts are consistent. The major source of error (consistently repeated in charts subsequent to the 1936 maps) is the failure to distinguish sites of vessel damage from their respective wreck locations. In order to evaluate this error a 40 percent sample of McBean's and Gibb's shipwreck list (including all vessels before 1890's) was compared with comments in Lewis and Dryden's, History of the Pacific Northwest (Wright, 1895). This comparison and a review of photos of shipwrecks in the Oregon Historical Society holdings suggest that the distributions of wrecks is accurate, though further study will be necessary to identify particular vessels.

Distribution of Shipwrecks

The study of shipwreck occurrence and distribution of wreck sites at the mouth of the Columbia is divided into pre-and post-jetty construction periods with the main emphasis on pre-jetty shipwrecks. Dividing the study into these two periods reflects changes in the cultural resource setting. These include significant changes in the depositional environment caused by jetty construction, differing types of vessels entering into the Columbia River, and the decreasing frequency of vessel loss.

In its natural state the bar at the mouth of the Columbia created hazards for navigation. Prior to completion of the South Jetty (1890) two main channels separated by the Middle Sands crossed the bar. Ships used the North Channel along Cape Disappointment as the main entry into the Columbia River mouth with the south channel as an alternate route. Shifting channel positions and increases in bar elevations confounded both inexperienced and experienced navigators, especially during and following periods of high river flow when the processes of scouring and shoaling were intensified. The consequences of these changes were especially significant during the fall-winter-spring storm period when shipping was the most hazardous. Of those vessels reported to have wrecked in the study area, 94 percent occurred during the winter months. This pattern of wrecks is consistent for both the pre-jetty period (1811-1888) and the post-jetty period (1890) to the present as indicated in figure D-1.

The distribution of wreck sites directly reflects the seasonality of shipwreck occurrence. Wrecks in the study area tend to be deposited (or grounded) on beaches, surfines or adjacent shoals. Approximately 70 percent of the wrecks in the study area are located on beaches or surfines with 21 percent on adjacent shoals, and thus, were salvaged to the greatest extent possible. This pattern is primarily a result of the fall-winter-spring wind pattern of prevailing north and south-westerlies which tended to move wrecked or damaged vessels toward mainland beaches. The remainder of the wrecks (approximately 9 percent) have no known provenance; a portion were last seen crossing the bar and reported lost while a fraction were reported as derelict vessels and drifted beyond the study area.

Preservation Environment

A preservation context is defined as the environmental setting within which cultural resources are located. Of primary importance for the preservation of shipwrecks is the depositional environment. In many instances the survival of shipwrecks is enhanced when sand or silt buries them. For example, on the California coast the wrecked schooner NEPTUNE (1892) survives in its high energy surf location because it is buried. The wreck was discovered during a period of extreme beach erosion (Delgado, not dated). In areas with continuous scouring, wrecks are unlikely to survive because wave and current forces break up vessels. Moreover, exposed wooden elements are destroyed by marine life and metal components by chemical reactions (Robinson, 1937). The intensity of the wind action along the coastal Pacific Northwest makes long-term Pacific Northwest marks long-term preservation rare and unlikely.

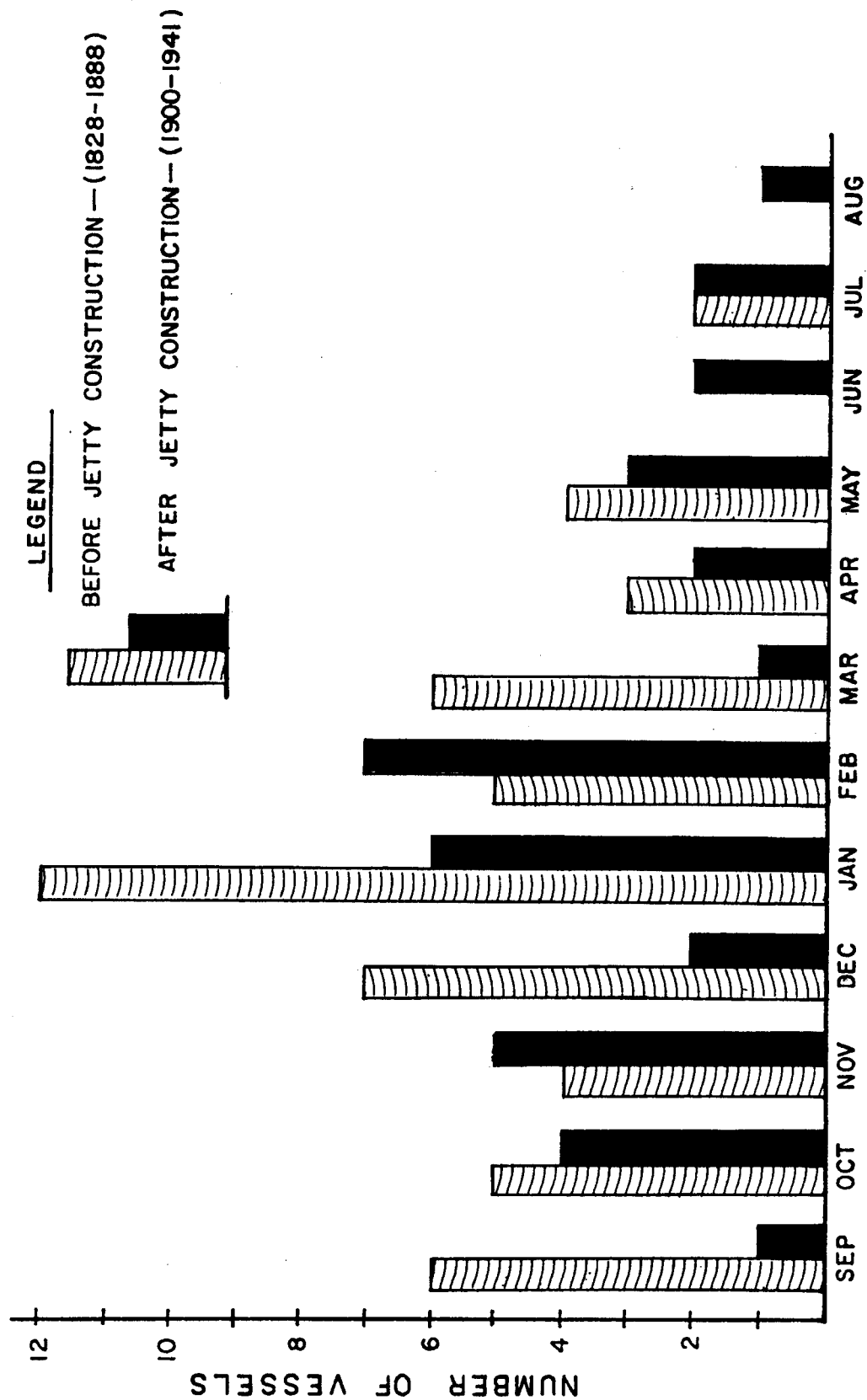


Figure D- 1: Seasonality of shipwrecks near the Columbia River Mouth, before and after jetty construction (McBean, 1936 and Gibbs, 1964).

During and after completion of the South Jetty (1888-1895) areas of accretion and scouring changed significantly. For example, as the Columbia river flow was directed into one channel, the Middle Sands and bar were lowered in elevation. Prior to construction of the jetties, bar depths ranged from 17 to 21 feet (Willingham, 1993). Present depths in these locations (due to dredging and scouring) range from 55 to 60 feet. Accretion patterns also changed; in some instances the rate of sand buildup accelerated. In 1880 a shoal developed along the north side of the south jetty and the beach at Clatsop Spit expanded into the former surfline.

The success of the south jetty in significantly increasing bar depths led to the construction of the North Jetty (1914-1917) in the Cape Disappointment vicinity (Willingham, 1983). As designed, the North Jetty furthered the scouring of the bar creating depths of 60 feet along the former shoal located on Peacock Spit south side.

Based on the pattern of shipwreck distribution and an evaluation of various preservation settings, the study area can be divided into high and low probability areas for identification of shipwreck locations (Figure D-2). High probability areas are those locations with high percentages of shipwreck sites and good preservation settings (areas of accretion). Low probability locations are areas of intense scouring (poor preservation contexts) with low frequencies of shipwrecks.

High Probability Areas

These areas are primarily beaches, surfines and shoal areas. High probability locations also include areas of sand transport by bottom currents, which extends the high probability area offshore to the 60-foot contour.

a. Clatsop Spit. High probability locations extend south from the South Jetty, including the beach and surfline down through the end of the project area. Along the spit's north side, high probability areas extend north to the ship channel paralleling the north side of the south jetty.

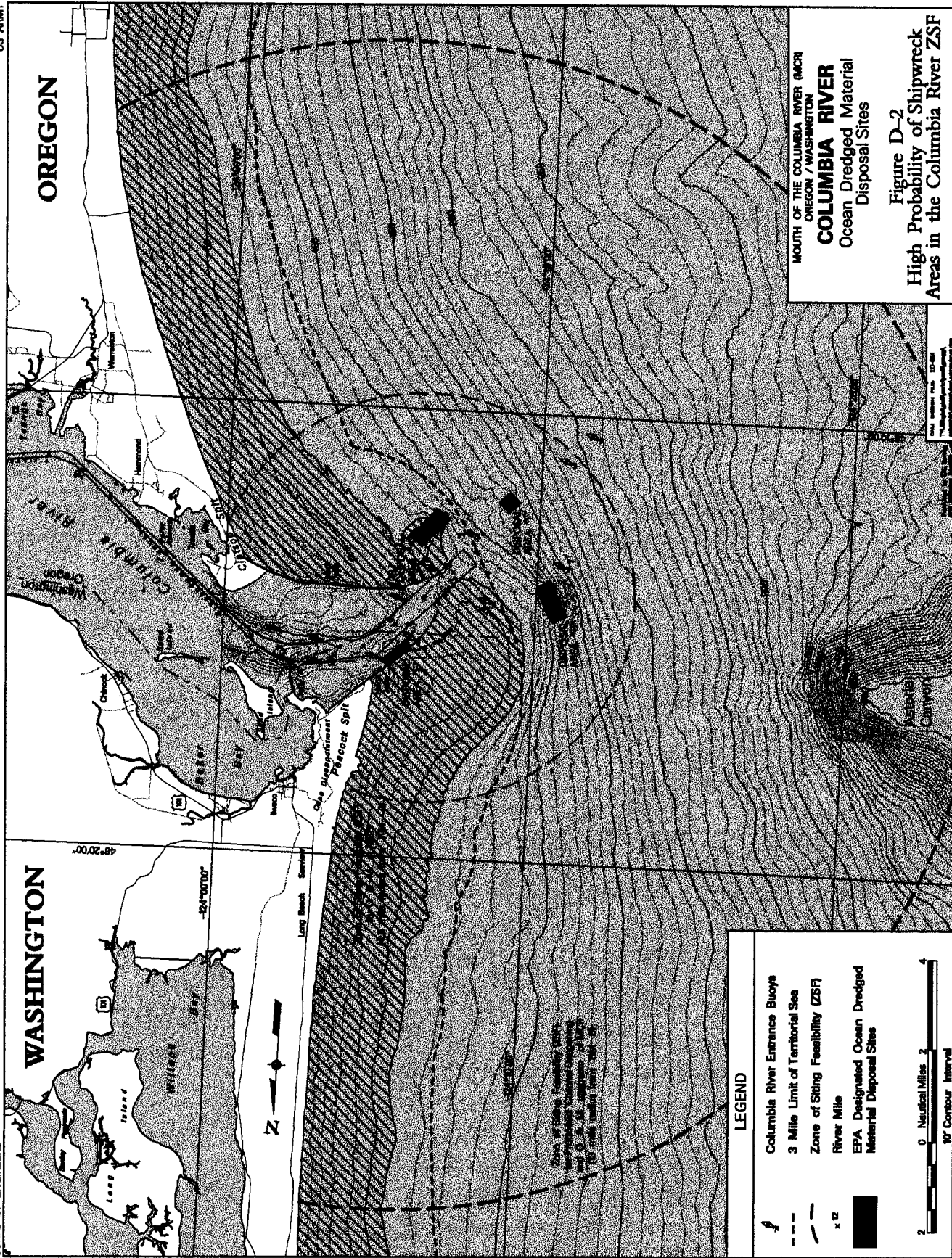
b. Cape Disappointment and Peacock Spit. High probability areas include Peacock Spit and shoal areas along the west and south sides of Cape Disappointment, and the beach and surfline extending north from Cape Disappointment.

Low Probability Locations

Generally, low probability locations are areas of intense scouring or places of minimum current transport. Low probability areas include:

a. Middle Sands-Bar. This location extends from the ship channel to the south side of the North Jetty and includes most of the former Middle Sands and Bar. The location is rated "low probability" because, though many vessels were damaged in this area, few actually wrecked here. Typically, damaged vessels drifted (or were carried by currents) out to sea and then were wrecked on the beaches or shoals.

(1) The preservation setting has also been significantly weakened by construction of the jetties. Channel depths are now approximately 40 feet deeper than pre-jetty periods. Thus, any wrecked vessels buried prior to jetty construction would have been exposed after the



jetties were built, as the Columbia River flow was forced into one channel. Consequently, the preservation setting is poor regardless of frequency of wrecked vessels.

(2) Though it is unlikely that wrecked vessels are present, records indicate that some of the vessels damaged at interior bar locations jettisoned cargo and in one instance cannons in an attempt to lighten vessels and pass over the shoals (Gibbs, 1964). These abandoned items may still be present along former shoals.

b. In general, areas beyond the 60-foot contour are low probability areas because this is the area of minimum current transport of sand (poor preservation). As noted above, most vessels wrecked on beaches, surfines or shoals; thus, low frequency of vessel loss and a poor preservation context support the low probability designation for locations deeper than the 60-foot contour.

Conclusions

Within the study area the least likely location for shipwrecks is offshore beyond the 40-foot contour. This area has the weakest preservation context and has the lowest frequency of recorded wreck sites. In order to minimize potential impacts on high probability areas, dredged material disposal locations should, wherever possible, be in areas deeper than the 40-foot contour.